VS-3S, VS-3P, VS-3R LiPoly-Controller

including voltage converter, electronic FET switch uC-battery monitor

User Manual

1. Design and Versions

This small device contains three functions:

- electronic FET security switch (not VS-3R)
- uC-battery monitor
- voltage converter

VS-3S and VS-3P are technical identical but in different packages. VS-3S has a plastic case and a carbon fiber front panel. Size and mountings are similar to standard servos which makes it easy to put it into servo mounts. VS-3P comes in a heat shrinking tube and can be mounted with double sided adhesive servo tape. VS-3R ist the same as VS-3P but without the electronical switch.

2. Functional Principle:

Many receivers, servos and other electronic devices are designed to be powered with 4-cell NiCd battery packs. Therefore the maximum allowed voltage is 6 volts. The usage of a 2-cell LiPoly battery pack is not allowed since it has 7,4 Volt nominal. This requires a voltage converter which reduces the LiPoly voltage to the lower receiver/servo voltage.

VS-3S/P/R has a built-in voltage regulator which works with 2 or 3 LiPoly cells or 5 to 7 MiCd/NiMH cells. The reduced output voltage can be adjusted between 5 and 6 volts by the user.

3. Connection:

VS-3S/P/R has silicon cables for the battery connection.
RED is the positive pole, BLACK is the negative pole. Double-check the correct connection. Reverse connection will destroy the device.
Make the usual transmission range test before operating your model !

4. Voltage Adjustment:

The output voltage can be adjusted with a small potentiometer. Connect a voltage meter to the output wires and adjust the voltage to any value between 5 and 6 volts. Usually the best voltage is 5,5 volts, which is setup from the factory. The output voltage cannot be higher than the battery voltage. When the setting is done, put some glue on the potentiometer.

5. Voltage Converter

This LiPoly Controller has an extremely low-loss voltage regulator. Even when the battery is almost empty it can produce a stable output voltage. The quality of the output voltage depends mainly on the battery quality and the wiring in your model. Especially for digital servos the wiring must be done with thick wires.

- Use short cables between battery and VS-3x and use only good gold-plated plugs.
- Use only high current batteries like modern LiPoly cells and put as many LiPoly cells in parallel as required to get sufficiant current for your model.

6. Electronic Switch

VS-3S/P is equipped with a highly reliable electronic safety switch. It is identical to our widly used ES-2 and uses the advantages of both, the electronical and mechanical switch in parallel.

7. uC-Battery Monitor

Monitoring the voltage of LiPoly cells is absolutely necessary. These cells can easily be damaged if discharged below 2,5 volts. Therefore this device has a built-in battery monitor which measures the voltage 100 times a second and stores the minimum value during operation of your model.
A dual-colour LED shows the status of the battery:

GREEN constant light	Battery full
GREEN blinking	Battery more than ½ filled
GREEN/RED blinking	Battery ½ filled
RED blinking	Battery less than ½ filled (charge !)
RED constant light	Battery almost empty (charge immediately !)

The battery monitor is setup by the factory to a warning voltage of 6 volts for operation with 2 LiPoly cells.
To adapt it to your model, a re-adjustment is required when it is mounted in the model or when anything has been changed (batteries, servos ...):

To adjust the battery monitor discharge your battery completely. Then charge about 15% of the total capacity. Then move all control sticks (move all servos) for 30 seconds. The LED should be just constantly ON in RED color. This value can be adjusted with a potentiometer, but ONLY if the power is switched OFF ! After moving the potentiometer, switch ON again and test the new setting. When the setting is done, put some glue on the potentiometer.

8. Battery Warning LED

VS-3S/P/R has an external 10mm extrelemy bright red LED. This LED lights and blinks like the small LED on the device. It can be mounted in a good visible position of your model. When this LED is blinking, charging is recommended. If it is constantly ON, immediate charging is absolutely necessary since the battery is empty.
Also this warning LED requires a correct setup of the battery monitor potentiometer.

9. Cooling

Coling is not required under normal operating conditions. For security reasons VS-3x has a heat sink for extremly conditions. Do not cover this heat sink.

11. Mounting

VS-3S is designed for servo mounts which are available in many models. Use the four rubbers and rivets as usual for servo mounts. The four holes are positioned to be compatible with JR/Graupner and Futaba/Robbe servo mounts.

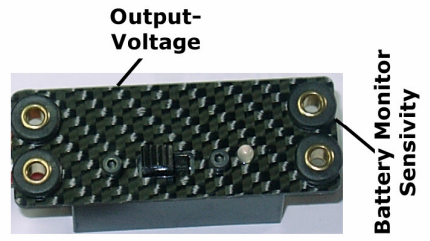
VS-3P/R are mounted with double sided adhesive tape or similar. Take care for vibration damping with foam or servo tape.

12. Technical Data

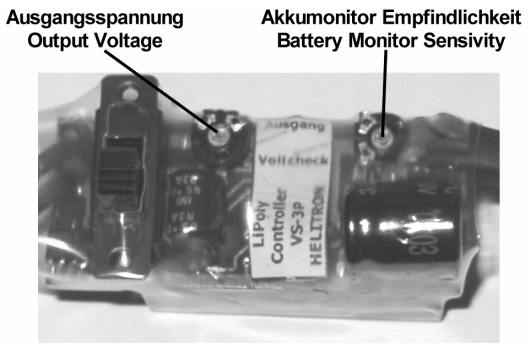
Maximum Current:	15 A (for usual load in models, not permanent load)
short peak current:	50 A
Battery voltage:	6 - 12 volts (Cells: 2-3 LiPoly, 5-7 NiCd / NiMH)
regulated output voltage:	abt. 5 - 6 volts
battery monitor:	dual-color-LED shows 5 battery states
Warning-LED:	10mm extremely bright
Weight VS-3S:	abt. 45 g incl. cables
Size VS-3S case:	38 x 20 x 25 mm (LxWxH), front panel 58 x 21,5 mm (servo size)
Weight VS-3P/R:	abt. 35 g incl. cables
Gr??e VS-3P/R:	49 x 19 x 20 mm (LxWxH)
functional priciple:	disortion free MOSFET technics (no noisy switching regulator !)

10. Position of Potentiometers

VS-3S:



VS-3P/R:



Operating Conditions and Limitations

Operation is permitted only for use in R/C models. Under any circumstances the operation is not permitted in manned aircrafts, medical instruments or in any environments, in which an instrument failure may cause humans come to harm !

Damaged or wet devices must not be operated. A connection with a 230 V a.c. mains is illegal. An operation in electromagnetic or electrostatic disturbed places is not admissible.

Installation, operation and use of this product cannot be watched. Therefore the user is responsible for the correct use of the product. The product may only be taken in operation, if the user understands and handles all risks and dangers which can result from the operation of the instrument. The manufacturer does not take any adhesion for personal injuries, damages to property, losses or costs, which result from incorrect use or operation of this product or are connected in any way with it. That applies in particular to claims for damages, which were released by failure or malfunctioning.

The legal warranty periods apply. All other requests excluded.

The product meets the relevant and mandatory EEC guidelines and standards.